SCIENCE

NEW YORK, DECEMBER 11, 1891.

HYGIENE AT ANN ARBOR.

In the memorial which asked for the establishment of a hygienic laboratory at the University of Michigan it was stated that one of the duties of those in charge of such an institution would consist in the examination, at a nominal fee to cover actual expenses, of articles of food and drink, on request of health officers throughout the State. This has already become a very important part of the work done at the laboratory, and a brief résumé of this work may not be without interest. The present notice will speak only of articles of food examined, omitting mention of the samples of water tested, although the latter have furnished the greater part of the work.

Four samples of meat supposed to have been taken from diseased animals have been examined. In only one of these did the microscopical examination bear out the supposition, and in this the presence of trichinæ was easily recognized. It is impossible from a study of the meat as it is sold in the market to detect many of the diseases to which our domestic animals are subject. The public can be protected from this source of disease only through an examination of the living animals by a competent veterinarian.

A can of currants, which was believed to have caused serious illness, with one fatal result, in Lapeer County, was carefully studied, both chemically and bacteriologically, with negative results. It was said by the neighbors of the family that the currant bushes had been freely sprinkled with a solution of Paris green before the ripening of the berries, and it was suspected that arsenic would be found in the fruit. This very improbable supposition was found to have no support. Unfortunately, none of the ejecta of the sick, and no part of the body of the man who died, were submitted to the chemist, and the cause of the sickness will probably never be known. Certainly, if they were cases of arsenical poisoning, the arsenic was taken with some other food or drink and not in the currants.

In some canned salmon which had produced alarming symptoms, there was found a germ which, when grown on ordinary media and with free exposure to the air, produces no poison. When thus grown, the germ itself, or its products, can be injected into animals without apparent effect, but when grown in a sterilized egg, the albumen of the egg becomes markedly poisonous, a few drops being sufficient to kill a white rat. It is highly probable that in the canning of the salmon, the contents of this can were not completely sterilized, and this germ, growing in the can, from which the air was excluded, elaborated the chemical poison to which the ill effects observed in the consumer were due.

Three new poisons have been found in decomposing milk. These belong to the proteid bodies and are albuminoses. They are due to the growth of germs which have been found in the intestines of children suffering from cholera infantum; and the characteristic symptoms of this disease, followed by death, may be induced in kittens by injecting a small amount of one of these poisons under the skin. The poisons differ from one another in some of their chemical and physical properties, but their toxicological effects seem to be practically identical. It is possible, however, that a closer study of their action may reveal differences which have not yet been detected.

A poisonous albuminose has been found in cheese also. It is probable that this may form in the cheese after its manufacture, and that it does not pre-exist in the milk from which the cheese is made. At least it is certain that one portion of a cheese may be poisonous, while another portion cut from the same cheese may be eaten with impunity.

A can of mince-meat which was believed to have poisoned a number of persons has furnished a perplexing but interesting study. That the meat is poisonous can be demonstrated by feeding it to cats and dogs, and cooking does not destroy its poisonous properties. However, the most careful and thorough study has failed to reveal the nature of the poison. Mineral and vegetable poisons are not present, and ptomaïnes and poisonous proteids have not been detected in the meat.

From the studies which have been carried on in the laboratory the following conclusions, concerning the manner in which meat and milk may become infected, have been drawn: —

(1) The infection may be due to the diseased condition of the animal from which these foods are obtained.

(2) The infection may be due to the inoculation of these foods with specific, pathogenic germs outside the body of the animal.

(3) Meat and milk, especially the latter, are often infected with suprophytic toxicogenic bacteria.

The transmission of tuberculosis from the cow to the child through milk, which is known in some instances to occur, is an example under the first head. The spread of typhoid fever through milk diluted with polluted water is an example of the infection with specific germs outside of the body; while all of those instances of poisoning from the eating of partially decomposed foods demonstrate the activity of those germs which, while not capable of inducing any specific disease, do elaborate most potent chemical poisons.

The number of poisons in decomposing food is probably large, the exact nature of the one found in a given case depending upon the character of the food, the nature of the infecting germ, the temperature and the stage of growth.

THE GREAT SALT DESERT OF PERSIA.[1]

The mountains of Siah Kuh rise to a height of about 5,000 feet above the level of the surrounding plains, which themselves constitute a plateau of about 3,000 feet to 4,000 feet above the sea-level. Looking towards the north, I could distinctly trace the course of the masonry causeway built by Shah Abbas to facilitate the communication with the south across this part of the desert, but the most remarkable feature of the landscape was that presented by the Darya-i-Namak,

[1] From a paper, by C. E. Biddulph, in Proceedings of the Royal Geographical Society, November.

the extent of which was fairly well distinguishable from this point of vantage, in spite of the glare which surrounded it.

For miles and miles away at our feet stretched what looked in the distance a vast frozen lake, but which was in fact a deposit of salt that entirely covered the low plains towards the south, and extended as far as the eye could reach towards the east and west, glittering in the sun like a sheet of glass. Towards the extreme west we imagined that this solid sheet was replaced by water, for we fancied we could see the ripples on its surface and the foam along the edge as the wind, which was high, drove it against the shore; but this may only have been owing to the heated air upon the surface, and the broken pieces of salt which were strewn along the margin. We sat for hours looking at this strange spectacle and examining it through our field-glasses, while our guides, who were some of the wild Ilyats, or wandering tribes which haunt this neighborhood, entertained us with all manner of strange stories regarding the peculiarities of its composition and the dangers to be encountered in traversing this vast deposit of salt.

According to their accounts, it was of the consistency of ice, and, like the latter, formed a coat of varying degrees of thickness upon the top of the water or swampy ground which lay underneath it. In some places they declared that this layer of salt attained a thickness of several feet, and that with such a degree of density that laden camels and mules could cross over it with perfect safety; while in other places where this was not the case, the crust of coagulated salt would break under their weight did they attempt it, and they would be engulfed in the waters or morass below beyond all hope of extrication. There appeared to be but one path, across which only those who were in the habit of traversing it, such as the owners of camels and mules, were well acquainted with, and which no one else in consequence attempted without a competent guide, for there was but little to mark its course, and if once lost sight of, the unfortunate traveller might wander for hours or days without finding it again, and probably end by dying of thirst if he succeeded in avoiding the more dangerous parts incapable of bearing his weight, where he would inevitably be swallowed up. They told us that the passage across this plain was quite impossible by day, at any rate if the sunshine were very bright, on account of the dazzling effect which its reflection upon the white surface of the salt produced, which was such as to quite prevent persons attempting it from seeing where they were going; and they recounted numerous instances of cases which had occurred of travellers who had disappeared from losing their way, and never been heard of again. Of course it seemed to us impossible to imagine how all this could be the case, for in a saturated solution of salt and water the salt would naturally be deposited upon the bottom, and not caked upon the surface; the guides, however, were so positive about the truth of what they said, and the appearance of the plain before our eyes seemed so peculiar, that our curiosity was thoroughly aroused, and we determined in consequence to completely change our intended route for the purpose of crossing the salt, especially as the moon being just at its full, every facility was offered for doing so. Our muleteers we found to make no objection, as they said that they were in the habit of crossing by this route, and that the surface of the salt was so hard and smooth, that it presented capital footing for the baggage animals. The following evening, accordingly, we found ourselves with our whole convoy of eight camels, sixteen mules, and three horses, approaching the margin of this salt plain, which was distant about fifteen miles from the foot of the mountain. As we neared this margin, the ground, which had been hitherto hard and dry, became damp and sloppy, so that we had to confine ourselves to moving along a distinct track, which had probably been used for centuries. To judge from the appearance of the ground here, a regular swamp must extend from the salt for some distance along its margin at certain seasons of the year, for on all sides were to be seen marks of animals who had strayed off the track, and got stuck in the clayey mud, from which it would seem in many cases, from the skeletons lying about, that they had been unable to extricate themselves.

After following this track, as it wound through this swampy ground for about a mile or so, we entered upon the sheet of salt itself, which, where the incrustation was thin, as was the case for some distance from its edge, was soft and sloppy, and mixed with earth resembling very much in its appearance the edge of the ice upon a frozen pool when a thaw has set in. As we proceeded, it gained more and more in consistency, till, at a distance of three or four miles from the edge, it looked like nothing more than a surface of very solid ice, such as might have been seen on any pond in England during the course of last winter. For this indeed, so far as its appearance went, it might easily have been mistaken, had it not been that, though the whole area over which it extended was perfectly level, the surface itself was not quite even, but resembled more that of ice which had partially thawed and then frozen again after a slight fall of snow; and, further, that instead of being continuous, it was broken up into countless polygonal blocks, whose dimensions varied from about six inches across to two or three feet or more. Of the solidity of this incrustation there could be no doubt, for there we were, camels, horses, and mules, travelling over it without a vibration of any kind being perceptible, or any sign of our weight making an impression on it. After marching for about eight or ten miles upon this strange surface, we halted to examine, as far as we could by the moonlight, its composition. We tried, by means of a hammer and an iron tent-peg, to break off a block of salt to take away with us as a specimen, but found it far too hard for us to make an impression upon, and though we succeeded in bending our tent-pegs almost double, we did not accomplish our wish; we managed, however, to chip off a lot of fragments, which we found here to be of the purest white; these were quite hard when we got them, but after keeping them a day or two they took up so much moisture from the air, that they got soft and friable and changed their color to a slatey hue.

We were assured by the muleteers and others that at this distance from the edge the salt deposit was as thick as eight or ten feet, and it seemed possible from our failure in the attempt to bore into it that this might not be any great exaggeration on their part; they stated also, as I have mentioned, that under this crust lay, if not standing water, at any rate a quagmire, and that if we had succeeded in our intention of breaking through the salt, the water from beneath would have burst through the opening thus made and flooded all the surrounding space; they further told us that in the winter, when the snow fell and melted on this surface, there was always water standing upon it, and that later on, as the snows on the surrounding higher ground thawed at the approach of spring, this increased to a depth of two or three feet; but that the mules could always cross so long as it did not get too deep for them to find footing, for that the layer of salt itself never lost any of its solidity, in spite of the water lying on it.

It is difficult to explain this phenomenon except upon the theory that this incrustation is the deposit accumulated upon these low plains in the course of centuries upon centuries, during which the annual melting of the snows upon the mountains and highlands, besides the rainfall and the perennial streams which drain into this basin, have brought down in the water from the strata of salt through which they pass these tremendous quantities of salt in solution. The summer sun has dried up the water by evaporation and left the salt deposit lying upon a soil more or less saturated with moisture, this layer of salt thus deposited has gained in thickness and consistency year by year until it has become a solid homogeneous mass too firmly bound together in the parts distant from the edge, where its thickness was most (owing to the greater depth of water which accumulated there, and consequent larger amount of salt deposited), to be broken by any pressure of water from below. The perennial streams have thus poured their waters underneath this strata. as the accumulation of water would naturally commence at the lowest part of the hollow, which would be about the middle of the salt plain, while the floods of water brought down by the rain and melting snow would overflow on to its surface from the margins. This is the only way by which it occurred to us that we could account for the dead level of the crust which, though covering a space of ground more or less hollow in its nature, as was evident from the run of the water all around, did not appear to us to slope in any direction, and also for the fact that on piercing through this crust water spouted out from below. Though we had no ocular demonstration of this fact, we were satisfied that it was the case from the accounts of a party of our servants whom we sent out the following day, when we had reached the further edge, to bring us a block of salt at a distance of a mile or two from the shore; another fact in support of this theory was that nearer the edge, where the crust was thinner and thus unable to resist the pressnre from below, it had evidently been burst by the rising of the water during the winter and spring, and lay tossed about in fragments.

After this halt we continued our march and arrived at the farther margin about 3 A.M.; it had thus taken us a good eight hours to cross this plain of salt, so that the distance traversed could not have been less than about twenty miles. As we expected, wo found that, as we approached the farther side, the crust of salt got thinner and thinner, till, on one occasion, getting slightly off the track, we quickly found the horses and mules sink through it almost up to the girths in a substance that resembled exactly melting snow, out of which we had to make the best of our way towards the harder material upon which we had been marching for so many hours. At length we hit off the beaten track which had been hardened by constant use during so many centuries, and were thankful indeed when we found ourselves again at last on *terra firma.*

NOTES AND NEWS.

AT the Franklin Institute, Philadelphia, on Friday evening, Dec. 11, a lecture was delivered by Mr. William L. Saunders, the well-known civil engineer of New York, on "The Compressed Air Power of the Future."

— During the summer the third and fourth stories of the south wing of University Hall, Ann Arbor, were fitted up as zoological and botanical laboratories. Each story affords about four thousand square feet of floor space. On each floor there are three principal rooms: a central room about forty-five feet square, a north room about twenty by forty feet, and a south room of the same size. There are also small rooms for the use of instructors. The fourth floor is devoted to botany, the central room being used as a general laboratory, the north room as a herbarium, and the south room as a research-laboratory for advanced students A small conservatory is to be constructed against one of the windows of the south room and will serve for experimental work. The other south window is occupied by an equarium. The third floor is devoted to zoology, the middle room being used as a general laboratory for beginners, and the north room for advanced work in vertebrate morphology. The south room has been divided into three compartments. One of these is lined with galvanized iron and serves to house the small animals required in the daily work of the laboratory. The second is used for alcoholic specimens, and the third is fitted up as a private laboratory for the professor in charge. In the zoological laboratories particular attention has been paid to the provision of means for keeping alive the animals that inhabit our inland waters. There are four large aquaria, and provision has been made for thirty-six smaller ones. There are also cages with running water for crayfish, frogs and other small animals that do not thrive well in ordinary aquaria. Each of these laboratories, the botanical and the zoological, can accommodate about fifty students. Contrary to expectation, they are now filled to nearly their full capacity, and by another year are likely to be crowded.

— Special Agent C. J. Murphy, charged with the introduction of Indian corn as a human food into Europe, has made a report to Secretary Rusk covering his work in Great Britain. In it he reviews the conditions which seem likely to encourage the use of this cereal food in Great Britain and other parts of Europe, and points out the various channels through which he has sought to introduce it, and the necessity for the co-operation of private individuals and commercial bodies in this country to take advantage of the work already done by the Government in this direction. Secretary Rusk has caused to be prepared for publication, in conjunction with Special Agent Murphy's report, a chapter upon the value of maize as food, by Dr. H. W. Wiley, chief chemist of the department, in which are shown the chemical composition of maize and its relative value for food purposes by comparison with other cereals. There is also a chapter, prepared by the assistant statistician, Mr. B. W. Snow, under the direction of the statistician, offering some additional observations as to the possibility of extending the use of this cereal among the people of Europe as a human food, and presenting a number of statistical tables showing the yield and value of our corn crop and the extent of our available resources in supplying home and foreign demand. The report is now in press and will be shortly ready for distribution.

— In a recent paper on the camel (*Zeits. für wissen. Geogr.*) Herr Lehmann refers, among other things, to its relations to temperature and moisture. Neither the most broiling heat, nor the most intense cold, nor extreme daily or yearly variations, according to an abstract in *Nature,* hinder the distribution of the camel. It seems, indeed, that the dromedary of the Sahara has better health there than in more equably warm regions; though, after a day of tropical heat, the thermometer sometimes goes down several degrees below freezing, and daily variations of 33.7° C. occur. In Semipalatinsk again, where the camel is found, the annual variation of temperature sometimes reaches 87.3°. In Eastern Asia, winter is the time the animals are made to work. In very intense cold, they are sewn up in felt covers. Of course each race of camel does best in the temperature conditions of its home: a Soudan camel would not flourish in North-east Asia. Camels are very sensitive to moisture. In the region of tropical rains they are usually absent, and if they come into such with caravans, the results of the rainy season are greatly feared. The great humidity of the air explains the absence of the camel from the northern slopes of the Atlas, and from well-wooded Abyssinia. This sensitiveness expresses itself in the character of different races. The finest, most noble-looking camels, with short silk-like hair, are found in the interior of deserts (as in the Tuarek region, in North Africa), and they cannot be used for journeys to moist regions. Even in Fezzan (south of Tripoli) the animals are shorter and fatter, with long coarse hair; and in Nile lands, and on

coasts, it is the same. These animals, too, are less serviceable as regards speed and endurance. Herr Lehmann states it as a law that the occurrence of the camel finds its limits wherever the monthly average vapor tension in the air exceeds twelve millimetres.

— A hundred years ago the natives of the valley of Chamonix who took travellers up the mountain suffered as much as their employers from physical sensations ascribed, no doubt rightly, to the rarity of the air. They were unable to walk more than a few paces without halting. Last autumn, says the Proceedings of the Royal Geographical Society, travellers who walked in early morning from the hut under the Bosses (14,000 feet) to the top (15,780 feet) had the company of five Chamoniards. They went up at a fair pace without resting. Arrived on the top, without a moment's pause, the men took their spades and shovels and began digging. They asserted that they did only about a third less work in the day than in the valley; and that they suffered no inconvenience from a prolonged stay in the Bosses hut; slept well, and ate largely. Their work was to excavate a tunnel in the summit ridge about thirty feet below the top. The object of this tunnel was to reach rock, in which a shelter-cave might be excavated. No rock had been found up to Sept. 11. The whole summit-ridge seemed to consist of compact opaque snow of exquisite purity. The rocks, a short distance from the top on the Italian side, were not considered available by the Frenchmen who were desirous of erecting the shelter. It was proposed, as no rock had been reached under the top, to carry there a wooden framework, in shape and size not unlike a bathing-machine, and fix it in the mouth of the gallery, in the hope that it might be dug out next summer and serve as a refuge for such scientific observers as might not be satisfied with the commodious hut near the Bosses.

— It has been said of more than one great and sudden sorrow, that it has eclipsed the gayety of nations, and the expression would argue a supposition that nations were, as a rule, naturally mirthful, says the *London Spectator*. Indeed, that seems to be the general idea that the world entertains of itself — namely, that it has a natural bias towards mirth and jolity, and only deviates into melancholy under the stress of untoward circumstances; that it numbers more inhabitants that are glad than those that are sorry; and that *Jean qui rit* predominates largely over *Jean qui pleure*. It is a comforting delusion — if it happens to be a delusion — and one that we should not wish to dissipate. Nevertheless, we cannot but express our doubt of its reality, for, should it ever have been true of the past, we should be driven to the most melancholy belief that the world is growing sadder as it is growing wiser, and that gayety and laughter are gradually decaying and departing from among us. That, evidently, is the opinion of one who has done his best to contribute to the mirth of his fellow-countrymen. Mr. James Payn fears that it is only too certain that people laugh less to-day than they used to do, and, at the same time as he deplores the fact, professes his inability to account for it. Of the two suggestions that he makes towards the solution of the problem, neither seems to us to be sufficient by itself to account for so dismal a change, though we have no doubt that both are factors in it. The idea of the vulgarity of laughter is neither strong enough nor sufficiently widely disseminated to have any real influence in quenching the natural expression of mirth. The innate sadness and dulness of democracy are probably much more powerful factors, in that the undeniable growth of democratic ideas among us must have brought about a corresponding decrease of mirth that provokes to laughter. But that, too, we should think, can hardly be sufficient by itself to have wrought any really perceptible change upon the mirthful spirit of the times; and yet we are fain to confess ourselves at a loss to advance any better reason for the decay of laughter, which we, as well as Mr. Payn, believe to be taking place. "Laughter holding both his sides" is well-nigh dead among us, so rarely is it heard; and the reason for its death, most people will say, is not because such laughter is vulgar and unseemly to the civilized man but because there is really nothing to-day to laugh at. Why there should be nothing now to laugh at, they would find it more difficult to explain. Hardly could they contend that we are less ludicrous than were our ancestors, or less capable of recognizing what is ludicrous. It must be some other source of laughter that is wanting in us.

— Hitherto it has not been possible to get lead to adhere to iron without the aid of tin since lead has little or no affinity for iron, but in a new process this difficult feat is accomplished, the coating being effected with a bath of lead of about 98½ per cent purity. The plates or other articles to be coated, according to *Engineering*, are first pickled in a bath to remove scale. Through this bath a weak current of electricity is passed, which is said to reduce the time required by one-third. From this bath the articles are passed as usual into another of lime water, which neutralizes the acid, and thence into a third of clear water. They are then immersed in a fourth bath consisting of a neutral solution of zinc and stannic chlorides, obtained by dissolving granulated zinc and tin in hydrochloric acid. From this bath they are passed into a drying chamber heated by steam, where the moisture on them from the last bath is evaporated, leaving behind a deposit of the mixed metallic chlorides, which protects the plates from oxidation. When dried these plates are ready to be passed into a bath of molten lead. On issuing from this bath the plates are found to be coated with a uniform and very adherent layer of lead. Though perfectly uniform this layer is nevertheless very thin. The ductility and strength of the iron are not decreased by the process, and a plate can be bent and closed, and again opened out, without breaking the coating. In the case of galvanized iron, bending the plate to a sharp angle causes the coating to crack. Samples of ship-plates have been coated and the riveting afterwards done in the usual way without breaking the coating, which, we may also remark, takes paint very well. The thinness of the coating is remarkable, as 2 oz. per square foot of plate proves sufficient, whereas 3 oz. of spelter are in general required in galvanizing. The inventors claim that an additional economy will be effected by the fact that there is no precipitate or sediment deposit in their melting tanks, as occurs with zinc, while, at the same time, the molten lead has no effect on the material of which the bath is constructed, which may, therefore, last indefinitely.

— Drs. Emmerich and Mastraum have published an interesting article in a German Hygienic journal on the cause of immunity from infectious diseases and their treatment, especially of swine erysipelas, and a new method of protective vaccination for it. Emmerich, according to *Lancet*, published in the year 1886 his doctrine that the cause of immunity from infectious diseases is a modification of the chemical process going on in the cells, so that the new chemical compounds formed act as microbe killers without doing any harm to the cells themselves. In consequence of the results of a series of experiments, Emmerich concluded that this antibacterial poison acts destructively on all the microbes within a few hours after their introduction into the organism. The publication of this doctrine having met with a good deal of opposition, he repeated his experiments, and again arrived at the same result, showing that the explanation of immunity from infectious diseases proposed in 1886 was justified. Granted the correctness of this, it follows that extracts from the tissue of any animal enjoying immunity are remedies against the corresponding infectious disease. Further experiments are now reported by Drs. Emmerich and Mastraum which show that an extract from the various tissues and the blood of rabbits which have been made proof against swine erysipelas is an excellent remedy for the disease, and that a hypodermic injection of the extract can serve as a rational protective inoculation. A rabbit was inoculated by having injected into the posterior auricular vein the fifth of a cubic centimetre of a fresh broth culture of swine erysipelas, diluted with fifty times its volume of distilled water. In the course of the following week or two a series of hypodermic injections of the same liquid was administered. For the purpose of preparing a liquid extract suitable for therapeutic or prophylactic purposes, the organs of the rabbit were cut up and submitted to a pressure of from 300 to 400 atmospheres, and the expressed juice filtered into sterilized bottles. A large number of white mice as well as rabbits were now inoculated with the swine erysipelas, and at the same time, or very shortly afterwards, an injection of the liquid

extract was administered to some of them. These remained alive, while all the others — that is to say, those which had not received an injection of the liquid extract of the organs of the infected rabbit — succumbed. Other experiments were carried out by which it was shown that this same liquid is capable of conferring immunity from the disease. Further experiments were made which showed that the bacilli were destroyed in six hours, and that in eight hours all were dead, or at least incapable of multiplication, but that the liquid extract produced extremely little effect upon the same bacilli outside the organism, so that the presence of living cells is evidently necessary for the destructive effect of the liquid extract to manifest itself. Another interesting result obtained was that bacilli taken fresh from the body were very much more active than their cultures in broth.

— A National Conference on University Extension is to be held in Philadelphia on Dec 29, 30, and 31. Representatives will attend this conference from all the leading colleges and universities of the United States and Canada, and delegates will be present from abroad. An opportunity will be given for the fullest acquaintance with this system of teaching, and discussions will be held on points in connection with its development in America.

— It is known that ozone can be abundantly produced by the electric silent discharge, and many years ago Siemens devised an "ozone-tube" for the purpose, consisting of two thin glass tubes, one within the other; the inner lined, and the outer coated, with metal, to which alternating currents of high tension are brought, acting on the gas to be ozonized within. From recent experiments in Siemens and Halske's laboratory, says *Nature*, it appears that a good result may be had with only one dielectric, and for this not only glass, but mica, celluloid, porcelain, or the like, may be used. Thus the ozone-tube may be arranged with a metallic tube within, and the outer tube a metal-coated dielectric; or the inner metal tube may have a dielectric coat, while a metal tube is the enclosing body. As metals that are little or not at all attacked by ozone, platinum, tin, tinned metals, and aluminium are recommended. Through the inner tube flows cold water, and through the space between the tubes air, dried and freed from carbonic acid. Several such tubes may be combined in a system, and worked with alternate currents (for single tubes the continuous current with commutator is best). An apparatus of this kind is now at work in the laboratory, yielding 2.4 mg. of ozone per second. Experiments are being made in supplying compressed ozone for technical use; and this has been accomplished with a pressure of nine atmospheres. One use of ozone, on which Herr Frölich lays special stress (in the recent lecture from which these data are taken), is the disinfection and sterilization of water. And doubtless with an abundant supply of the substance, the use of it would be greatly extended.

— A statement of the operations of the Missouri Geological Survey during the month of November has been issued by the State geologist, Arthur Winslow. Detailed mapping has been prosecuted in Henry and Benton Counties, and about 135 square miles have been covered. Field work of this kind is now suspended with the approach of winter, and the members of the party will be engaged during the winter months in plotting the results of the past season's work. Inspections of iron ore deposits have been made in Crawford, Dent, Phelps, Butler, Carter, Shannon, and Howell Counties. Inspections of zinc and lead deposits have been made in Crawford, Franklin, Washington, and Jefferson Counties. Inspections of coal deposits have been made in St. Clair County. The crystalline rocks have been mapped over an area of about 300 square miles in Washington, Iron, and Crawford Counties. In Greene County geological mapping has been prosecuted in six townships. Further, a small amount of work has been done in the north-western part of the State, in the study of the glacial deposits of that region. In preparation for the report on the paleontology of the State, collections have been examined in Washington, Ithaca, and New York, and much valuable material has been acquired. In the office the preliminary report on the coal deposits of the State has been finished and is now ready for the printer. The preparation of the reports on the mineral waters of the State and on the paleontology has also steadily progressed. In addition, reports on the Fredericktown and Higginsville sheets have been begun. Proofs of the latter have been received from the engraver and will soon be printed and ready for distribution. Further, much work has been done in the office upon the preparation of maps and models, and material has been collected from various railways in St. Louis for a correct dictionary of altitudes and a hypsometric map of the State. The microscopic studies of the crystalline rocks is still in progress.

— The first news that has reached Europe concerning the new Danish expedition to East Greenland is dated June 29. At that date the "Hekla" was in 71° north latitude, near Jan Mayen, and far from the east coast of Greenland. The condition of the ice this summer has rendered the navigation of the Arctic Seas extremely difficult. The pack extended far to the south, and surrounded Jan Mayen with a circular barrier. The east coast of Greenland was unapproachable, and the "Hekla" was anchored for the time in a bay of the pack. Still Captain Knutsen intended to make for the Greenland coast between 73° and 76° north latitude, the ice, according to the seal-hunters, appearing to be less dense in that quarter.

— The botanic exhibition of the Appalachian Mountain Club is to be held at the club room, 9 Park Street, Dec. 9–12, inclusive, from 10.30 A.M. to 5.30 P.M. Of the specimens of flowering plants, many are foreign; but our own local flora is well represented by collections personally obtained by club members expressly for this exhibition. A good many alpine plants are shown, from the White Mountains, the Catskills, Colorado, and Switzerland. There is a fine California collection, including supplementary flower-studies in water colors; and some excellent specimens have been brought from Alaska and British Columbia. Among the flowerless plants, there is an interesting set of more than three hundred different ferns, many of them from New Zealand, the Canary Islands, Africa, and other distant regions. Fully half of the specimens are gifts to the club, so that a good beginning of a permanent herbarium has been made.

— Some interesting experiments were recently made in Boston by Edward Atkinson, to determine some questions relating to the spontaneous ignition of wood-pulp. According to an exchange the experiments were made in an Alladin oven with a thermometer to indicate the temperature. Two slabs of wood-pulp were tied in the oven, one in contact with a loose iron shelf, the other without any contact. The first ignited at 370°, the last at 430°. In two previous tests the oven was opened when the thermometer reached 425°, but the pulp did not take fire until the introduction of air, when it ignited instantly. In speaking of the matter Mr. Atkinson says: "We have been able heretofore to imitate spontaneous combustion by putting animal or mineral oil on fibrous substances; we have tried experiments by mixing mineral or paraffine oil with animal oil to determine the exact point or proportion at which the paraffine or mineral oil will prevent oxygenation of animal or vegetable oil, but there has been no apparent means of making this oxygenation visible until the present test. This test may explain the causes of many fires. Heretofore there has been no knowledge of the ignition by rapid oxygenation of a highly-heated substance, mainly carbon or almost pure cellulose, without any admixture of grease or chemical. It would appear that finely-divided and moderately heated carbonaceous material, holding air in its pores, may ignite at a relatively lower temperature than ordinary wood. It would seem well, therefore, to avoid the use of sawdust for sweeping floors, and its storage near hot kitchens. Ice-houses are known to be bad risks. A little gudgeon-grease in the sawdust and some fresh air may explain the reason."

— Professor Clarence A. Waldo, recently of the Rose Polytechnic Institute, is now at De Pauw University, Greencastle, Ind.

— Professor M. W. Harrington having been appointed chief of the United States Weather Bureau, the astronomical observatory of the University of Michigan is temporarily in charge of the newly-appointed instructor in astronomy, Mr. W. J Hussey. The former instructor, Mr. W. W. Campbell, has accepted a position as assistant at the Lick Observatory, Mount Hamilton, Cal.

SCIENCE:

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Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

THE APPLICATIONS OF HYPNOTISM.[1]

At the present time, when even medical experts hold themselves in an attitude of indecision towards hypnotism, it is not surprising that the laity are at a loss to reconcile the conflicting opinions of the advocates of the practice and its opponents.

There are two leading features as to the nature of hypnosis, held by the two leading schools of hypnotism. That of the Salpêtrière, enunciated by the eminent physician, Charcot, is, that hypnotism is pathological, and, in fact, a form of hysteria, and occurs in hysterical subjects only; while the Nancy school contends that hypnosis is a physiological condition analogous to natural sleep, and that nearly all persons of sane mind can be hypnotized.

Much credit is due to Charcot for his researches into hypnotism at a time when the subject was held in contempt or abhorrence; but it is to be deplored that he and his followers, by experimenting mainly on hysterical subjects — for the most part women — have forced us to regard their experiments as incomplete, and the arguments based upon them as futile. As agricultural laborers, sailors, soldiers, and the majority of children are shown to be exceptionally susceptible to hypnotism, we must, if we accept Charcot's dictum, very greatly enlarge our views as to the prevalence of hysteria; indeed, we shall be forced to assume that one-half at least of humanity are victims of this form of nervous derangement.

The fact is, that there are two kinds of hypnotism: "le grand" and "le petit." The former, which has been so developed by cultivation at the Salpêtrière as almost to constitute a new nervous disease, is undoubtedly to be seen in comparatively few subjects, which few are always of pronounced hysterical type; but the latter, "le petit hypnotisme," which is employed by Bernheim and by all physicians practising the Nancy method, is a condition of very constant occurrence. Many persons, and even some men of science, seem to imagine that by hypnotism is meant the production of such a state of unconsciousness and automatism as is seen in the subjects at the Salpêtrière, or on public platforms. But Bernheim's definition covers a much wider field. "Hypnotism," he says, "is the induction of a psychical condition in which the subject's susceptibility to suggestion and ability to act upon it are enormously increased."

Suggestion is the key to the hypnotic problem. By it the subject is put to sleep or calmed into a state of receptive quiescence, and by it he is guided in the way of cure. The degree of suggestibility is not necessarily proportioned to the depth of sleep. Some persons are barely hypnotizable, and yet a suggestion will take possession of their mind and dominate their actions; while others, even in the most profound hypnotic sleep, will refuse to receive or to act upon suggestion. As an illustration of great suggestibility accompanying a slight degree of hypnosis, I may refer to a case that has come under my own notice. The patient, whom I may call Dr. A., a university professor and a member of several learned societies, was an inveterate smoker, and hardly to be found without a cigarette in his mouth, except when he was eating or sleeping. As he was a man of highly irritable and nervous temperament and suffered from sleeplessness and atonic dyspepsia, such excessive smoking was the very worst thing for him. He knew well, and had been told by several medical men, that the habit was undermining his health and ruining his nerves, yet he found himself absolutely unable to give it up. I hypnotized him, and he fell into a state of languor resembling sleep, but without loss of consciousness. I then suggested to him that he should no longer have any desire for tobacco, and that he should feel much better for leaving it off. After a few minutes I aroused him, and found that he had a perfect recollection of every word I had said to him; but he remarked that previously, when his physicians had assured him that tobacco was poison to him and had advised him to give it up, he had mentally resented their assertions and their counsel, while now, under the influence of hypnotism, he felt that the words I had spoken were so convincing that it would be impossible to go against them. As a matter of fact, he at once gave up smoking, and I hear from him that he has felt no inclination to resume the habit. He was hypnotized only three times, and it is now eighteen months since he underwent the treatment. Still, frequently though such cases may occur in practice, we may take it as a general rule that the deeper the hypnotic effect, the greater is the influence of suggestion.

Suggestibility apart from hypnotism comes within the experience of us all. Every one has some portion of such susceptibility, and in many it is very highly developed, and may be worked upon for good or evil with signal effect. The drunkard, converted by a Gough or a Father Mathew, is redeemed through suggestion; and through it the victim of evil example or evil solicitation falls to his ruin. We are physically benefited by it when words of hope and cheerful surroundings lead us to forget bodily pain or to entertain the idea of its removal, or even to make the effort required for self-cure — as when a sufferer from functional paralysis is induced, by kindly encouragement, to move the affected limb. On the other hand, suggestion may, and continually does, work physical harm, as when some unwise sympathizer or some meddling Cassandra utters prognostications of sickness and trouble, which, by reason of the depression they induce, are likely to undermine the health of a nervous hearer.

[1] Abstract of a paper by Charles Lloyd Tuckey, M.D., in The Contemporary Review for November.

Those ills which the hypnotist can cure by suggestion, he can also frequently produce by the same method. As he can suggest the disappearance of pain, as in some forms of paralysis he can bid the return of strength and suppleness to the heavy, powerless limb, so he can induce the suffering and the impotence of disease. If, during the hypnotic trance, I tell my friend Dr. C. that on awakening he will find one leg paralyzed and feel rheumatic pains in his shoulder, the suggestion is certain to be carried out; and he drags his leg, and complains of twinges in his shoulder, until I assure him that he is cured. But Dr. C. is remarkably susceptible to hypnotism. Fortunately, a subject must generally fall into a profound sleep before he consents to receive disagreeable suggestions; whereas a slight degree of hypnosis will, in most cases, be a sufficient vehicle for those that are beneficial. I have seen the very painful and obstinate neuralgia left after "shingles" entirely and permanently removed in a few minutes by suggestion. The patient, a sailor, was very slightly influenced by hypnotism, but was extremely "suggestible."

Bernheim maintains that natural sleep is the result of auto-suggestion: we lie down in the accustomed place, at the usual hour, in the expectation of sleep, and it generally comes. He maintains also that hypnotic and natural sleep are essentially identical. While agreeing with him that there is a great similarity between the states; that natural sleep is often of the hypnotic type — for instance, the dreamless sleep of childhood; — that hypnotic sleep may frequently be used as a perfect substitute for natural sleep, — into which, indeed, it often passes, — I still believe that the two states differ from each other in several essential points.

The theory that hypnotism, when used in the treatment of moral cases, subverts free will, is erroneous. The originally healthy and well-disposed subject, who has sunk into habits of injurious self-indulgence through temptation from surroundings, exhaustion from overwork, anxiety, or some other cause outside himself, has for the time being lost his freedom of will, while the victim of an hereditary taint or congenital deficiency, who is naturally weak or vicious, or strong only in the direction of vice, may be said never to have possessed it. To the former, hypnotic suggestion will very probably restore his power of will; in the latter, the treatment may possibly develop it, especially if he be yet young, and time and patience be given to the task.

Regarding the capacity to hypnotize: no special gift seems required, though one operator may succeed in a case where another has failed. The secret of success here is the same as in other methods of medical practice, and lies in knowing when to apply the remedy, and how to gain the confidence of the patient. Several medical men of my acquaintance are easily hypnotized, but this does not prevent them from successfully hypnotizing others, any more than having been anæsthetized by chloroform oneself prevents one administering it to a patient.

The question of applying hypnotism to children, as a means of moral reformation, is a very serious one. Many people say that they would rather have their children naturally bad than hypnotically good; and I confess to feeling much sympathy with the sentiment, if the badness is within normal limits.

Voisin reports cases of older people who have been reformed by hypnotic suggestion, including some of the worst type of Parisian women, on whom other means of conversion had been vainly tried. Many of these cures, he says, have proved permanent; but my own experience leads me to fear that in such extreme cases a fresh temptation — a stronger suggestion to evil — generally causes a relapse.

Those physicians who advocate the use of hypnotism advise it, not as a specialty, but as an auxiliary, an adjunct to the practice of every medical man. It is found remarkably effective for the alleviation of pain, even in cases of incurable organic disease, such as cancer, heart disease, and locomotor ataxy; and for the relief of sleeplessness, prostration from overwork of mind or body, hysterical suffering, and such disturbances of nutrition as accompany anæmia and phthisis.

The dangers arising from the popularization of hypnotism have, I think, been overrated, though, as I have said, there is no denying that they exist, and that precautions should be taken against them. The two opposing schools of Paris and Nancy have at least one point in common: they both insist on the necessity of ordering and limiting the practice of hypnotism.

One of the most striking warnings on record against the abuse of hypnotic experiments is the story of Ilma Szandor, which Dr. von Krafft Ebing has given at length in a small volume. This young girl, a Hungarian by birth, was of hysterical constitution, and proved extraordinarily susceptible to hypnotic suggestion. She fell into the hands of persons whose ill-judged zeal and curiosity carried them to lengths which seem almost incredible, and her life was ruined by cruel and senseless experiments. She was hypnotized several times a day for some months, apparently by any one who chose to practise upon her, and was made the victim of very painful and distressing suggestions. For instance, a pair of scissors was on one occasion laid upon her bare arm, and she was told that they were red-hot, and would burn her. All the effects of a severe burn were brought about by this suggestion; an inflamed and blistered spot, taking the shape of the scissors, appeared on her arm, and took months to heal. The unhappy girl at last became insane, and, I believe, still remains so.

Professor Pitres mentions several cases where the excessive and misapplied use of hypnotism, accompanied by injurious suggestions, has been followed by grave attacks of neurasthenia; and in my own practice I have met with instances where amateur hypnotism has led to violent attacks of hysteria, followed by delusions. I have found it necessary to exercise great caution in hypnotizing hysterical and neurotic subjects. When I first began to use this treatment I wished to determine some points of interest, and for this purpose I frequently hypnotized two good subjects, one a strong, active-minded woman, the other a very muscular and robust young officer, whom I had cured of alcoholism. After a few weeks the woman began to complain of continual weariness, and of occasionally feeling dazed and confused; and the young man invariably suffered from headache if I hypnotized him more than once in the twenty-four hours, or if I made suggestions of an unpleasant or irritating character. On perceiving this I gave up experimenting on those subjects, and the unpleasant symptoms passed off in a few days. But at the time I formed the opinion, which subsequent events have strengthened, that hypnotism is not such a perfectly harmless thing as some would make it out to be, and that the hypnotic state should never be induced except under trustworthy advice, for a definite beneficial object, and by a responsible operator. If sound-minded and healthy persons suffer from being hypnotized too frequently though every care is exercised in the operation, how much greater suffering and risk must be incurred when the subjects are probably

delicate and neurotic, when the hypnosis is brought about by faulty processes, and the suggestions made are almost invariably of a painful or sensational kind. Many of the subjects used for exhibition are hypnotized twice a day for months, and in consequence of this frequent repetition become reduced to a condition of automatism, vacuity, and dependence on the will of the operator, which it is painful to contemplate. The subjects chosen by public hypnotists are nearly always of a low type of intelligence, and are generally "weedy" and deficient in physical stamina. A few weeks of exhibition will probably render such subjects unfit for any subsequent employment requiring application or reasoning power.

As one of the earliest among English physicians to study the Nancy method of treatment by hypnotism, I feel it my duty to speak very plainly of the dangers attending the ignorant and injudicious use of this powerful agent. I am the more impelled to do so, because the cause of medical hypnotism has suffered through the confusion existing in the popular mind between it and the hypnotism of shows and entertainments. When people assert that hypnotism is essentially dangerous, and that its employment should be made illegal, it is as well to inquire what variety of hypnotism is referred to. If the speaker has in mind either amateur experiments or public performances, any hearer who has studied the subject must heartily endorse what he has said; but if, as is sometimes the case, no discrimination is used, and therapeutic hypnotism shares the general condemnation, we should ask, in the first place, whether it has been proved a dangerous agent in the hands of experienced medical men, and, in the second, whether its benefits are such as to justify the incurring of any risk.

In the hands of a conscientious and experienced physician the use of hypnotism is, I believe, absolutely devoid of danger. This is my own experience; and last year I wrote to the chief exponents of the treatment on the Continent, in America, and in Great Britain and Ireland, asking them for their opinion on this subject. They all replied that they had never met with untoward results, and that they could not conceive the possibility of such results if proper care and judgment were used. The venerable pioneer of suggestive hypnotism, Dr. Liébeault, who has practised for over thirty years among the poor of Nancy, gives the result of his experience in an extremely candid and interesting paper. In this he tells of two or three slight *contretemps* which happened to him in his early days of inexperience, but he goes on to say that he has never seen any serious accident occur through the use of hypnotism, and records his conviction that harm can result only through faulty method, or ignorance on the part of the operator. The fact that Dr. Liébeault has practised hypnotism so long in a comparatively small town, and that Professor Bernheim has, during the last five years, hypnotized a large proportion of the patients who have passed through the Nancy General Hospital without having any evil results to register, is, I think, a strong proof of the safety of this treatment. But even though hypnotism were proved to be attended by a certain amount of risk, we should hardly be justified in altogether prohibiting or abstaining from its use, if at the same time we could show that its advantages exceeded its drawbacks, and that it enabled us to treat successfully some diseases and conditions which resist other measures.

Among such intractable diseases, alcoholism takes a foremost place. The value of hypnotism in treating this malady may be better understood by the reader if I refer to one or two examples drawn from my own experience. Among the patients who came under my care about the end of 1888 was a successful and prosperous merchant, a member of a neurotic and alcoholized family. He had been addicted to alcohol for about three years, but drank only at intervals, between which he entirely abstained from stimulants and worked steadily at his business. When the alcoholic mania seized him he would surreptitiously leave his wife and family, and go into a mean lodging, where he could drink night and day without hindrance. His family would spend days in seeking him, and he would generally be found sleeping off the effects of a debauch. As time went on the attacks became more frequent, and between the last two only a fortnight had elapsed. He was placed under supervision and treated daily by hypnotic suggestion for about three weeks, but he was only slightly influenced by hypnotism, and always retained full consciousness. He returned home, and had no relapse for seven months, throughout which time he worked hard and regularly. In the summer of 1889 he travelled in Scotland on business, and during this journey the double shock of a thorough wetting and some bad news from home had such an effect on him that he took to whisky. He drank heavily for one day, but he was able to pull up of his own accord, and during the following week he came to see me, and to have the anti-alcoholic suggestions repeated. Since then he has continued absolutely sober, and that without any further treatment. To show the immense power wielded by hypnotism, I shall quote the case of the manager of an important company, who was on the point of being dismissed from his post when he first consulted me, early in this year. This gentleman was very susceptible to hypnotism; he fell at once into a profound sleep, and proved one of the best subjects I have ever seen. As he belonged to an alcoholized family, it was necessary to forbid him all use of stimulants; therefore he was told, while in the hypnotic state, that alcohol was poison to him, and that the taste of it would in future make him violently ill. To test the efficacy of this suggestion, a small glass of beer was given to him during the hypnotic sleep, and another about half an hour after his awaking; on both occasions the dose instantly brought on an attack of sickness, though the patient had no consciousness of the suggestions he had received. He returned to his home and business after about two months, and has had no relapse. A few weeks ago, I had a letter from his mother, informing me that he was very ill with pleurisy. The attack came on suddenly while he was attending a cricket match, and as he complained of violent pain and faintness, a well-meaning friend made him take the usual rough-and-ready remedy — a glass of whisky. He had hardly swallowed the spirit when he again rejected it, thus affording a proof of the continued action of suggestion after the lapse of three months, and under altogether exceptional circumstances.

Alcoholism is by no means the only disease originating in bad habits and want of self-control. Morphinism, for example, and the "tobacco habit," have also their victims, and the suggestive treatment which has been found useful in alcoholism has also proved efficacious against those kindred evils.

In a large proportion of cases, hypnotism should be used as an adjunct to other remedial measures, and by no means to their exclusion. And in cases of incurable disease it can be only palliative and directed to the relief of distressing symptoms, such as pain, sleeplessness, want of appetite, and mental depression. By hypnotic suggestion we can often reduce symptoms to their "anatomical expression," and take

the sting from disease. Bernheim, when taunted with unwisdom because he employed hypnotism in the treatment of consumptive patients, and asked if by suggestion he expected to cure the disease and destroy the bacilli of tubercle, replied that he hypnotized those patients, not with the expectation of restoring disintegrated lung tissue, but because his suggestions relieved the wearing cough, reduced perspiration, improved the appetite, and gave refreshing sleep. If the disease was far advanced, suggestion by relieving the symptoms which constituted its sting enabled the poor sufferers to enjoy some comfort during the short spell of life remaining to them. If it had not passed the early stages there was a possibility that, by placing the patient under favorable bodily and mental conditions, reaction towards cure might be initiated and assisted.

After all, is it not the aim of most medical treatment to be thus Nature's auxiliary? The physician can aspire to do little more than place his patient in the most favorable position for cure, and thus aid that *restitutio ad integrum* which is the natural and vital reaction towards health. Some writers object to hypnotism for the reason that it removes pain without curing the disease of which it is a symptom, and aver that pain is Nature's danger signal, which should not be lowered unless the cause of danger is removed. Their objection carries little weight when hypnotism is employed by experienced physicians, who know how to interpret the signal, and who, while they try to dispel pain, do not neglect to combat the disease which it betokens. And we must not forget that in certain cases — for instance, in many forms of neuralgia — the pain is the disease, and its removal means the recovery of the patient; nor that pain is often the most distressing accompaniment of incurable disease. How can we let the poor victim of cancer or of locomotor ataxy drag out months or years of agony, when we have at hand the means of mitigating his sufferings? For such a one, the physician can often effect by hypnotism what otherwise he could effect only by narcotics and sedatives; and with this advantage, that hypnotism does not impair the mental and physical powers nor weaken the moral sense, as such drugs must do if their use be persisted in.

An objection frequently urged against hypnotism is that a person who has been subjected to it, even only once or twice, becomes over-susceptible to hypnotic influence. Repetition of the hypnotic process does generally increase susceptibility, though not to the extent which is often supposed. I have frequently seen a practised hypnotist fail absolutely to affect a subject who had many times before been under hypnotic influence. It should be the object of a medical hypnotist not to weaken but to strengthen his patient's will-power, and to make him understand that — to quote Bernheim's words — he hypnotizes himself under the guidance of the operator. It is a good plan to protect young and very susceptible subjects by impressing upon them during hypnosis that they are not to be hypnotized by any one except their own physician. I have seen sensitive persons who were thus protected resist all the efforts of the most successful hypnotists. It is hardly necessary to insist on the advisability of never hypnotizing women, nor, as a rule, very young persons, except in the presence of a responsible guardian or friend.

"RECENT Tendencies in the Reform of Land Tenure" is the title of a pamphlet lately published by the American Academy of Political and social Science. The author is Professor E. P. Cheney of the University of Pennsylvania, who has written several other essays on the land question.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

A Suggestion on Telepathy.

MANY persons, when in some public place, as a street-car, church, or theatre, have felt the peculiarly unpleasant sensation that some one is staring at them from behind. Some claim to be able to make certain persons of their acquaintance look around by simply gazing fixedly at them. I am assured by one that at any public gathering she is able, without fail, to make a very self-conscious and sensitive friend look around in an annoyed manner when stared at from behind and entirely out of the range of the friend's vision. One person in seeming physical isolation appears to control another at some little distance. Such cases seem not uncommon, and scientific investigation of them might throw some light on certain cases of telepathy and hypnotism.

Some people also claim to be immediately aware of the presence of certain individuals — to have a physical intuition wholly without sense impression. This is doubtless generally due to an interpretation, unconsciously made, of various sensations which are not welded into ego-experience, and so escape memory. Yet sometimes the physical break seems so complete that any sensation seems impossible, and the feeling of presence appears to be a true telepathy. Of one thing I am convinced, namely, that we must first study all instances of what may be termed short-distance telepathy before we can expect to make much progress with long-distance telepathy. HIRAM M. STANLEY.

Lake Forest University, Dec. 2.

AMONG THE PUBLISHERS.

IN the December number of *Babyhood* there are medical articles on "Biliousness in Children," "Nursery Ventilation and Warming," and "The Care of Delicate Children."

— The New York Mathematical Society has begun the publication of a monthly bulletin. Three numbers, for October, November, and December, have already appeared. The address of the society is 41 East Forty-ninth Street, New York.

— *The Review of Reviews* will issue about the middle of December a brochure that is sure to create a sensation. It is nothing less than a compilation of anecdotes and materials upon apparitions and ghostly hallucinations, prepared by Mr. Stead, the English editor, and issued with the assistance and approbation of the British and American societies for psychical research, of which Professor Sidgwich of Cambridge University, England, and Professor James of Harvard University are in their respective countries the guiding spirits.

"Jerusalem, the Holy City," is the title of Mrs. Oliphant's new book which Messrs. Macmillan & Co. are to publish early in December, uniform in style with "The Makers of Florence," "Royal Edinburgh," etc., by the same author. It will be illustrated by Hamilton Aidé. The same firm will soon publish in this country "In Cairo," by William Morton Fullerton. The author formerly occupied the position of literary editor of the *Boston Advertiser*. For several years past he has lived abroad, and the book to be published embodies the result of a winter's sojourn in Egypt. It will be illustrated with drawings by Percy Anderson, the English artist, who was Mr. Fullerton's fellow-traveller in Egypt and Greece. A book of researches in the Peloponnesus, which Mr. Fullerton explored on donkey-back, will soon follow.

— The December number of the *Educational Review* completes the second volume of that journal. President Seth Low of Columbia has a suggestive paper on James Russell Lowell as an educator; Principal W. C. Collar of the Roxbury, Mass., Latin School studies the action of the colleges on the schools; Professor Joseph Jastrow contributes a psychological study of memory and association; while Dr. D. A. Sargent of Harvard discusses the subject of college

athletics and heart disease. Mr. Thomas Davidson traces the development of the so-called "seven liberal arts." Other articles are by Colonel Francis W. Parker, Principal E. H. Russell of the Worcester, Mass., Normal School, and Superintendent T. H. Balliet of Springfield, Mass. The English educator, Dr. J. G. Fitch, in his letter from London, tells of the educational topics that are interesting Great Britain. An article by Professor S. S. Laurie of Edinburgh touches upon the secondary school curriculum and the question of Greek in colleges and universities.

— D. C. Heath & Co., Boston, have just published an "Italian Composition," by C. H. Grandgent, author of their Italian Grammar. Part I. supplements the Grammar by giving additional exercise work with references. Part II. comprises selections of simple Italian with exercises based on each. Part III. consists of additional exercises in composition and formulas used in letter-writing. A vocabulary, together with an appendix containing notes on pronunciation, and a list of irregular verbs follow.

— The eighth volume of the new "Chambers's Encyclopædia" will be issued by J. B. Lippincott Company in the course of a few days. It extends from Peasant to Roumelia, and contains copyright American articles on Pennsylvania, Petroleum, Philadelphia, Phonograph, William Pitt, Pittsburgh, Poetry, Prisons, Protection, Edgar Allen Poe, Railways, Rhode Island, Rocky Mountains, Roman Catholic Church, etc., together with new maps of Pennsylvania, Queensland, Rhode Island, and Roman Empire. The articles are concise yet thorough, and omit nothing that will be of practical value to the reader; the letter-press is up to the high standard of the previous volumes, and the illustrations are accurate and finished.

— An important addition to chemical literature comes from the press of J. B. Lippincott Company, entitled "The Tannins: a Monograph on Vegetable Astringents," by Henry Trimble, Ph.D. Dr. Trimble, who holds the chair of analytical chemistry in the Philadelphia College of Pharmacy, began to prepare his book about twelve years ago, but it grew under his pen to greater proportions than he at first intended, so that, as it stands before us now, it comprises a nearly complete history of the subject of which it treats. The author has had access to all the numberless publications by others which touch upon vegetable astringents and their properties, and this fact is well attested by the exhaustive bibliography which accompanies his book. The treatise, however, is not a mere compilation of the writings of accepted authorities, but it embraces the results of the author's own extensive original research.

— E. W. B. Nicholson, Bodley's librarian, is about to issue, through Mr. Quaritch in London, and the Clarendon Press Depository in Oxford, the first two of his *Bodleian Fac-simile Series*, which is to consist of faithful reproductions of some of the rarest printed works in the Bodleian. Instead of pursuing the usual course of issuing limited editions at the highest price at which a comparatively small number will buy, he intends to issue unlimited editions at the lowest prices which will allow a moderate profit. If they cannot be sold at a profit, he is still ready to go on with them, so long as they do not involve absolute loss. One of the two first issues is a photo-lithograph of the unique and perfect "Ars Moriendi; that is to saye the craft for to deye for the helthe of mannes sowle," printed about 1491 by either Caxton or Wynken de Worde. The original would probably sell for some hundreds of pounds; the fac simile, with a bibliographical introduction, will be published at eighteen pence. The other fac-simile is a photo-lithograph of a remarkable historical tract, printed at Rome in 1572, the year of the Massacre of St. Bartholomew's Day. The title is "Ordine della solennissima processione fatta dal Sommo Pontifice nell, alma citta di Roma, per la felicissima noua della destruttione della setta Vgonotana." The Bodleian copy is the only one mentioned by Brunet, or, so far as is known, by any one else; and the fac simile will be published at a shilling.

— The latest of the Johns Hopkins Studies in Historical and Political Science is a pamphlet by Professor Frederick J. Turner on "The Character and Influence of the Indian Trade in Wisconsin," originally presented as an address before the Historical Society of that State, and since rewritten and enlarged. It opens with some good remarks on the importance of trading expeditions in the history of nations, commerce having often been the pioneer in preparing the way for religion and the other higher agencies of civilization. Bancroft's assertion that the Jesuits led the way in the discovery and settlement of the North-west is contested by Professor Turner, and apparently with good reason, and he affirms that "the Jesuits followed the traders," who had already established their posts. His account of the Indian trade in his own State begins with the early French voyages, then relates the struggles between the French and the English, and afterwards between the English and the Americans for the control of that trade, and gives a brief sketch of what our Federal government afterwards did to foster and regulate the trade. He shows how important was the influence of the Indian trade in colonial times, and brings out the fact that in war time the Indians were allies of the party with whom they traded. Professor Turner's work is written in better style than many of the papers in the series to which it belongs, and it cannot fail to be of interest to all students of our Western history. The Hopkins Studies for 1892 will embrace the following: The Bishop Hill Colony, a Religious Communistic Settlement in Henry County, Illinois; Church and State in New England; Church and State in Early Maryland; The Religious Development in the Province of North Carolina; Causes of the American Revolution; Maryland's Attitude in the Struggle for Canada; Local Government in the South and South-west; and The Quakers in Pennsylvania.

— The Grolier Club's edition of Mr. George William Curtis's "Washington Irving," which will be ready for subscribers about Dec. 15, will contain portraits of Irving and Matilda Hoffman.

— The November issue of *Insect Life* (Vol IV., Nos. 3 and 4), the periodical bulletin of the Division of Entomology of the United States Department of Agriculture, contains an illustrated article by Professor C. V. Riley, on the habits and life history of the twelve-spotted diabrotica, an insect long familiar to gardeners as an enemy of squashes and melons, but which has within recent years been found to attack in the larva state and damage seriously young corn. A history of the facts bearing on this phase of the habits of the insect is given, together with a full account of its habits and development from the egg to the adult insect. It also contains an editorial article by Mr. L. O. Howard on "The Larger Corn Stalk-borer" (*Diatræa saccharalis* F.), an insect which for the past three-quarters of a century has been recognized as a serious enemy of the sugar cane in the West Indies and for a less period as an enemy of cane and corn in the Southern States, and which has been particularly abundant in the cornfields of Louisiana, where it was first recorded as early as 1857. It has since that period slowly spread throughout the Cotton Belt, and with the present season has rather suddenly appeared in Maryland and Virginia, seriously injuring corn. A full bibliographical history of the insect is given, together with a careful account of its life history and habits, illustrated by a number of text figures. This article will be of particular interest and value to the Southern planter, and also to the corn-grower of the Mississippi Valley, as the insect manifests a tendency to migrate northward, as evidenced by its appearance in Virginia and Maryland.

— Messrs. Longmans, Green, & Co. have published a "School Atlas of English History," prepared by Samuel Rawson Gardiner as a companion to his "Student's History of England." It consists of sixty-six maps and twenty-two plans of battles and sieges, all well executed and neatly colored, and illustrating every important phase of English history from the time of the Roman occupation to the present day. A large number of the earlier maps are necessarily devoted to showing the growth and later amalgamation of the various Anglish and Saxon kingdoms and the long-continued struggle for possessions in France, the shifting and often puzzling aspects of those events being elucidated in a clear and intelligible manner. The civil wars of the seventeenth century, too, are well illustrated by both maps and plans; and the growth of England's colonial and Indian empire receives careful attention. There is also a large number of maps showing

the growth of the various continental states and England's relations with them; so that the book will serve to a certain extent as an atlas of European history. The plans of battles include most of the important ones from Senlac to Sebastopol; but the only one relating to colonial and American affairs is that of the siege of Quebec. Great pains have been taken to secure accuracy, a few errata being corrected in an introductory note; and the present writer at least is not competent to detect any others. Without maps in some form history is unintelligible, and it is a great convenience to have a collection specially prepared; and even those who have given considerable study to the history of England will find this atlas both interesting and useful. With its neat workmanship and excellent paper the book is well worth the dollar and a half that it costs.

— The New York History Company, 132 Nassau Street, New York, will publish at once the first volume of "The Memorial History of the City of New York," edited by General James Grant Wilson.

— Swan, Sonnenschein, & Co. will publish shortly in their Social Science Series an analysis of the first volume of Karl Marx's "Capital," by Dr. Aveling, similar to his analysis of the writings of Charles Darwin.

— An international exhibition of the book trade and its allied branches, says *The Publishers' Weekly*, will be held at the Palace of Industry at Antwerp, July to August, 1892. Application may be made to the Netherlands Society for the Promotion of the Book-trade, Amsterdam.

— Damrell & Upham, Boston, have almost ready a work by Professor Horsford concluding his researches into the coming of the Northmen, "The Landfall of Leif Erikson on Cape Cod in the Year 1000, and the Site of His Houses on the Bank of Charles River in Cambridge." An appendix will contain the Saga of Erik the Red and other documents pertaining to Vineland.

— G. P. Putnam's Sons will publish immediately an authorized edition of Charles Morley's study of dog life, entitled "Teufel, the Terrier: His Life and Adventures," and of the companion volume on "Peter, a Cat o' One Tail." The former is illustrated with designs by Yates Carrington and the latter by Louis Wain (Peter's proprietor).

— Estes & Lauriat have just issued, simultaneously with Chapman & Hall, a delightful contribution to Dickensiana entitled "A Week's Tramp in Dickens-Land." It is the record of a pilgrimage made by two enthusiastic Dickensians during the summer of 1888. Estes & Lauriat also issue an illustrated volume, by Madame de Bovet, translated and condensed by Arthur Walter, entitled "Three Months' Tour in Ireland."

— The Britannia Company of Colchester, England, makers of engineers' tools in a large way, are issuing a series of illustrated manuals giving practical information to users of tools. Their first manual, on "Turning Lathes," edited by James Lukin, is intended for technical schools and apprentices. It gives just such directions as to turning, screw-cutting, and metal-spinning which a learner would seek at the hands of an expert. In the second manual Screws and Screw-cutting are treated, with the addition of a chapter on the milling machine. The Whitworth, American, and Swiss systems of screws are described and compared, machine and hand methods of manufacture are detailed, and the rules for calculating the dimensions of screw-cutting wheels are presented with full tables for application in practice.

— Harper & Brothers will publish immediately Professor T. R. Lounsbury's "Studies in Chaucer," which is not, as might be imagined, an edition of the works of the poet, but embraces a discussion of almost every problem connected with his life and writings, including chapters on the Learning of Chaucer, the Chaucer Legend, the Text of Chaucer, Chaucer's Relation to Religion, Chaucer in Literary History, and other subjects connected with the study of his works and the time in which he lived. The work is comprised in three volumes, and is supplemented by a full index. They will publish at the same time an important work on "English Words," by Professor Charles F. Johnson of the chair of English literature, Trinity College, Hartford, which embraces an elementary study of derivation, including a discussion of the literary value of words, and, besides its value as a text-book, will be of interest to all who care to acquire correctness of diction; also "Glimpses of Nature," a collection of popular essays by Dr. Andrew Wilson of Edinburgh.

— P. Blakiston, Son, & Co., Philadelphia, have just ready the new London edition of the late Dr. Carpenter's work, "The Microscope and Its Revelations," edited by Professor Dallinger. The London *Athenæum* says: "Special attention has been given to all that appertains to the practical construction and use of the instrument, but the interests of amateurs have not been neglected. The earlier chapters of the book have been entirely rewritten, and the work throughout has been brought up to date. It is no secret that Dr. Dallinger has spent a vast amount of labor on this new edition. Mr. A. W. Bennett and Professor Jeffrey Bell have relieved him as much as possible of the work of revising the chapters on botany and zoology."

— *The Popular Science Monthly* is rapidly coming to the front as an illustrated magazine. Until recently it published only a few simple drawings, where they were specially needed to supplement the text, but the January number is to have no less than sixty illustrations. The kinship which Darwinism recognizes between mau and the brutes is strongly confirmed by the facts contained in an article on "Tail-like Formations in Men." The researches of several German physiologists are here presented, and pictures of a number of these strange formations are given. "Theology and Political Economy" is the subject of Dr. Andrew D. White's next chapter in his Warfare of Science series. Paying for the use of money is the matter in which the Church has most seriously obstructed commerce, and a full history of the conflict over interest is given in this article. An illustrated sketch of certain "Remarkable Bowlders," by Mr. David A. Wells, is to appear. Mr. Carroll D. Wright will have a study of "Our Population and its Distribution," showing the movement of the centre of population westward, and how the people are distributed with respect to topographical features of the country, rainfall, humidity, etc. All interested in the teaching of young children will be glad to read Mrs. Mary Alling Aber's account of "An Experiment in Education." It is a sample of the sporadic efforts to introduce little children to real knowledge, which promises valuable results in the near future.

— The sixth, and last, volume of "The Century Dictionary" is now ready, and contains 1,046 pages, beginning with the word *strub*. Its successful completion, substantially within the time originally announced by the publishers, is a notable event. The preface issued with the first part is dated May 1, 1889, the supplementary note to the preface issued with the last part, Oct. 1, 1891. Between these dates has been published, in twenty-four parts, which have followed each other with almost mechanical regularity, a dictionary of 7,046 large quarto pages, containing, from the printer's point of view, two-thirds as much matter as the "Encyclopædia Britannica," and including about 500,000 definitions of over 215,000 words, 50,000 defined phrases, 300,000 illustrative quotations, and 8,000 cuts. The sixth volume contains its full share of important and interesting articles. The definitions of *sun* and *sun spot* (both by Professor C. A. Young) with their engravings illustrate well its encyclopedic richness, as do also such articles as those under *transit*, *temple*, *swallow*, *sub-*, *substance*, *trot* (with its reproduction of instantaneous photographs by Muybridge), *trust*, etc. The volume also exhibits the usual large number of admirable cuts, such as those under *tabard*, *testudo*, *tiger*, *toboggan*, *tomb*, *tube* (pneumatic), *tunnel*, *typesetting-machine*, *Venus*, *victory*, *Vides-trelda*, *Vidua*, *Viduinæ*. It closes with a list of over 3,000 authors and authorities cited in the course of the work, and with what is, perhaps, the most interesting single thing it contains, a reprint of the list of amended spellings recommended by the English Philological Society and the American Philological Association, headed by an introduction which leaves no doubt where the editors of the dictionary stand as regards spelling-reform. While this list, which has as yet almost no actual usage to support it, and was indeed intended

only as a step toward something more complete, could not properly be incorporated in the body of the dictionary, Professor Whitney believes that no lexicographer should ignore it. He expresses his opinion in the following vigorous language: "The reformed orthography of the present, made with scientific intent and with a regard for historic and phonetic truth, is more worthy of notice, if a dictionary could discriminate as to worthiness between two sets of facts, than the oftentimes capricious and ignorant orthography of the past. It need not be said in this dictionary that the objections brought on etymological and literary and other grounds against the correction of English spelling are the unthinking expressions of ignorance and prejudice. All English etymologists are in favor of the correction of English spelling, both on etymological grounds and on the higher ground of the great service it will render to national education and international intercourse. It may safely be said that no competent scholar who has really examined the question has come, or could come, to a different conclusion; and it may confidently be predicted that future English dictionaries will be able to recognize to the full, as this dictionary has been able in its own usage to recognize in part, the right of the English vocabulary to be rightly spelled." These principles, as the last sentence quoted intimates, have, as far as possible, been carried out in the dictionary with regard to the spelling of words the orthography of which varies, by the adoption of the simplest or most "phonetic" form; and "The Century" is thus the first dictionary to support both by practice and preaching this great movement of philological reason and of common sense.

—The ethnographic parallel between Israelite and Indian, which was published by Colonel Garrick Mallery in the *Popular Science Monthly*, in 1889, has been translated into German, by Dr. Friedrich S. Krauss, the German ethnologist. "Israeliten und Indianer" (Leipzig, Grieben, 1891, pp. 106, 12°) is the title of the version, which renders the thoughts of the original in good German and in a free and easy style. The preface also contains a biography of the author, who is a member of the Bureau of Ethnology in Washington. The article forcibly refutes the existence of monotheism among the Indians, and none of the languages has any word corresponding to our term God. The differences between the Jewish and the Indian institutions and mode of life are thoroughgoing, but, nevertheless, there are many similarities of striking nature, based on the simplicity of life to be met with with primitive nations, and Mallery has sought everywhere to point out the causes on which they are based.

—The ornamental designs and symbols found on American pottery, implements, objects carved in wood, and other utensils, have been discussed from the genetic and historical standpoint by Professor Alois R. Hein of the Vienna University ("Mäander, Kreuze, Hakenkreuze und urmotivische Wirbelornamente in

CALENDAR OF SOCIETIES.

Philosophical Society, Washington.

Dec. 5.—R. S. Woodward, Maxwell's Theory of Electrostatics; J. F. Hayford, The Detection by Azimuth Observations of Variations in the Pole or the Vertical; A Recent Check on the Relation between the Metric Units of Length and Mass.

Natural Science Association, Staten Island.

Nov. 14.—Election of officers: president, N. L. Britton; treasurer, Eberhard Faber; recording secretary, C. F. Simons; corresponding secretary, Arthur Hollick; curator, Joseph C. Thompson.

Appalachian Mountain Club, Boston.

Dec. 8.—Rosewell B. Lawrence and Percival Lowell, Bandaisan, Miomote, and Matsushima, two papers, descriptive of a trip in North-western Japan.

Amerika," Wien, Hölder, 1891, 8°, illustrated, pp. 48). Hein's object is to trace the causal connection existing between the ornaments of the most primitive nations and the products of art in its most refined and accomplished stage. The ornamentic display found among the so-called "savages" has been entirely neglected by the esthetic school of ornamentists, and still here it is where we have to look for the origin of this speciality in art. The meander and the Cyma are found highly developed on South American tissues and other manufactures; the cross is a decoration as well as a mystic symbol in both hemispheres, although in this part of the world it meant the winds, the four points of the compass, and the rain-god. A figure resembling the hooked cross, or swastika, is found on South American vases, baskets, and shell-engravings. The Mexican hieroglyphs for *year* and *time* differ but little from the svastika of India, and, like it, is intended to mark rotation. For its manifold useful hints we recommend Hein's pamphlet to all artists and art historiographers.

— *The Political Science Quarterly* for December opens with an article by Professor A. D. Morse of Amherst College on "The Democratic Party," in its historical origin and its present tasks. Paul L. Ford describes the non-intercourse policy of the colonists in 1774, under "The Association of the First Congress;" Charles B. Spahr, writing of "The Single Tax," combats the practicability of Mr. George's panacea; Professor F. A. Giddings, discussing "Sociology as a University Study," makes suggestions as to the character of the new science; Professor D. G. Ritchie of Oxford contributes valuable material in the "History of the Social Contract Theory;" M. Ostrogorski presents a careful and exhaustive study of "Woman Suffrage in Local Self-Government;" and Dr. Frederic Bancroft, with recent publications as his text, writes sympathetically of "Lincoln and Seward" and critically of "Their Latest Biographers." Some twenty-five books are noticed in the department of reviews, and Professor William A. Dunning brings his "Record of Political Events" down to Nov. 1.